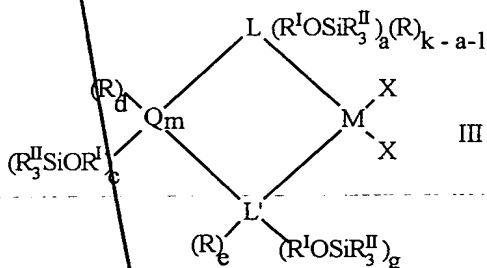
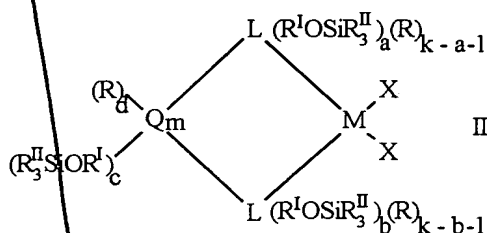


## CLAIMS

1. Heterogeneous catalytic system obtainable by reacting a porous inorganic support with an alumoxane and subsequently supporting at least one metallocene compound thereon, characterized in that the metallocene compound is defined by the following general formulas:



wherein:

L, equal to or different from each other, is selected from the group comprising: cyclopentadienyl, indenyl, tetrahydroindenyl, fluorenyl, octahydrofluorenyl or benzoindenyl;

each R is independently selected from hydrogen, C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>3</sub>-C<sub>20</sub> cycloalkyl, C<sub>6</sub>-C<sub>20</sub> aryl, C<sub>3</sub>-C<sub>20</sub> alkenyl, C<sub>7</sub>-C<sub>20</sub> arylalkyl, C<sub>7</sub>-C<sub>20</sub> alkylaryl, C<sub>8</sub>-C<sub>20</sub> arylalkenyl, linear or branched, optionally substituted by 1 to 10 halogen atoms, or a group SiR<sup>11</sup><sub>3</sub>;

each R<sup>I</sup>, equal to or different from each other, is a divalent aliphatic or aromatic hydrocarbon group containing from 1 to 20 carbon atoms, optionally containing from 1 to 5 heteroatoms of groups 14 to 16 of the periodic table of the elements and boron ; preferably it is: C<sub>1</sub>-C<sub>20</sub> alkylene, C<sub>3</sub>-C<sub>20</sub>cycloalkylene, C<sub>6</sub>-C<sub>20</sub> arylene, C<sub>7</sub>-C<sub>20</sub> alkenyl, C<sub>7</sub>-C<sub>20</sub> arylalkylene, or alkylarylene, linear or branched, or a group SiR<sup>II</sup><sub>2</sub>;

each R<sup>II</sup> is independently selected from C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>3</sub>-C<sub>20</sub> cycloalkyl, C<sub>6</sub>-C<sub>20</sub> aryl, C<sub>3</sub>-C<sub>20</sub> alkenyl, C<sub>7</sub>-C<sub>20</sub> arylalkyl, C<sub>8</sub>-C<sub>20</sub> arylalkenyl or C<sub>7</sub>-C<sub>20</sub> alkylaryl, linear or branched; preferably R<sup>II</sup> is methyl, ethyl or isopropyl;

each Q is independently selected from B, C, Si, Ge, Sn;

M is a metal of group 3, 4 or 10 of the Periodic Table, Lanthanide or Actinide;

each X is independently selected from: hydrogen, chlorine, bromine,  $OR^I$ ,  $NR^I_2$ ,  $C_1-C_{20}$  alkyl or  $C_6-C_{20}$  aryl;

$L'$  is N or O;

5 when L is cyclopentadienyl k is equal to 5, when L is indenyl k is equal to 7, when L is fluorenyl or benzoindenyl k is equal to 9, when L is tetrahydroindenyl k is equal to 11 and when L is octahydrofluorenyl, k is equal to 17;

z is equal to 0, 1 or 2;

x is equal to 1, 2 or 3;

10 y is equal to 1, 2 or 3;

x + y + z is equal to the valence of M;

m is an integer which can assume the values 1, 2, 3 or 4;

a and b are integers whose value ranges from 0 to k-1;

f is an integer whose value ranges from 1 to k;

15 g is an integer whose value ranges from 0 to 1;

c and e are equal to 0 or 1;

a + b + c is at least 1;

a + g + c is at least 1;

d is equal to 0, 1 or 2;

20 when Q is B then c + d = 1;

when Q is C, Si, Ge or Sn, then c + d = 2;

when  $L'$  is N, then g + e = 1;

when  $L'$  is O, then g = 0 and e = 0.

25 2. Heterogeneous catalytic system according to claim 1 wherein the group  $R^I OSiR^I_3$  is selected from  $CH_2-CH_2-OSiMe_3$ ,  $CH_2-CH_2-CH_2-OSiMe_3$ ,  $CH_2-O-CH_2-OSiMe_3$ ,  $O-CH_2-CH_2-OSiMe_3$ ,  $SiMe_2-CH_2-CH_2-OSiMe_3$ ,  $SiMe_2-OSiMe_3$  or  $SiMe_2-CH_2-CH_2-CH_2-OSiMe_3$ .

3. Heterogeneous catalytic system according to claims 1-3 wherein M is titanium, zirconium or hafnium.

30 4. Heterogeneous catalytic system according to claims 1-4 wherein the alumoxane is represented by the formulas:



35 wherein R is alkyl or aryl group containing from 1 to 20 carbon atoms; n ranges from 1 to 40, and m ranges from 3 to 40.

56. Heterogeneous catalyst system according to claims 1-5 wherein the inorganic support is selected from silica, alumina, silica alumina, aluminium phosphates and mixtures thereof.

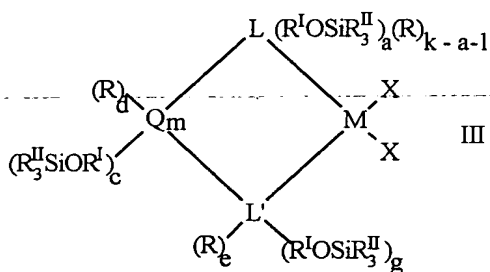
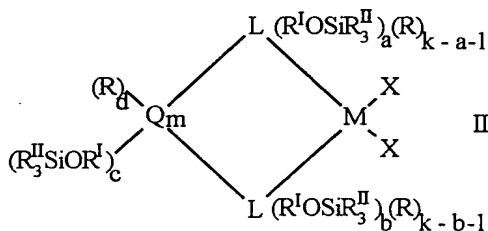
57. Heterogeneous catalyst system according to claims 1-6 wherein the content in transition metal is comprised between 0.01 and 3% by weight.

58. Heterogeneous catalyst system according to claim 1 wherein the content in transition metal is comprised between 0.1 and 1% by weight.

59. Process for the polymerization of alpha olefins in slurry or in gas phase characterized by the use of the heterogeneous catalyst system of claims 1-8.

60. Metallocene compounds according to the following formulas:

10



15

wherein:

L, equal to or different from each other, is selected from the group comprising: cyclopentadienyl, indenyl, tetrahydroindenyl, fluorenyl, octahydrofluorenyl and benzoindenyl;

20 each R is independently selected from hydrogen, C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>3</sub>-C<sub>20</sub> cycloalkyl, C<sub>6</sub>-C<sub>20</sub> aryl, C<sub>3</sub>-C<sub>20</sub> alkenyl, C<sub>7</sub>-C<sub>20</sub> arylalkyl, C<sub>7</sub>-C<sub>20</sub> alkylaryl, C<sub>8</sub>-C<sub>20</sub> arylalkenyl, linear or branched, optionally substituted by 1 to 10 halogen atoms, or a group SiR<sup>II</sup><sub>3</sub>;

each R<sup>I</sup>, equal to or different from each other, is a divalent aliphatic or aromatic hydrocarbon group containing from 1 to 20 carbon atoms, optionally containing from 1 to

25 5 heteroatoms of groups 14 to 16 of the periodic table of the elements and boron ; preferably it is: C<sub>1</sub>-C<sub>20</sub> alkylene, C<sub>3</sub>-C<sub>20</sub> cycloalkylene, C<sub>6</sub>-C<sub>20</sub> arylene, C<sub>7</sub>-C<sub>20</sub> alkenyl, C<sub>7</sub>-C<sub>20</sub> arylalkylene, or alkylarylene, linear or branched, or a group SiR<sup>II</sup><sub>2</sub>;

each  $R''$  is independently selected from  $C_1$ - $C_{20}$  alkyl,  $C_3$ - $C_{20}$  cycloalkyl,  $C_6$ - $C_{20}$  aryl,  $C_3$ - $C_{20}$  alkenyl,  $C_7$ - $C_{20}$  arylalkyl,  $C_8$ - $C_{20}$  arylalkenyl or  $C_7$ - $C_{20}$  alkylaryl, linear or branched; preferably  $R''$  is methyl, ethyl or isopropyl;

each  $Q$  is independently selected from B, C, Si, Ge, Sn;

- 5  $M$  is a metal of group 3, 4 or 10 of the Periodic Table, Lanthanide or Actinide; preferably it is titanium, zirconium or hafnium;

each  $X$  is independently selected from: hydrogen, chlorine, bromine,  $OR''$ ,  $NR''_2$ ,  $C_1$ - $C_{20}$  alkyl or  $C_6$ - $C_{20}$  aryl;

$L'$  is N or O

- 10 when  $L$  is cyclopentadienyl  $k$  is equal to 5, when  $L$  is indenyl  $k$  is equal to 7, when  $L$  is fluorenyl or benzoindenyl  $k$  is equal to 9, when  $L$  is tetrahydroindenyl  $k$  is equal to 11 and when  $L$  is octahydrofluorenyl,  $k$  is equal to 17;

$z$  is equal to 0, 1 or 2;

$x$  is equal to 1, 2 or 3;

- 15  $y$  is equal to 1, 2 or 3;

$x + y + z$  is equal to the valence of  $M$ ;

$m$  is an integer which can assume the values 1, 2, 3 or 4;

$a$  and  $b$  are integers whose value ranges from 0 to  $k-1$ ;

$f$  is an integer whose value ranges from 1 to  $k$ ;

- 20  $g$  is an integer whose value ranges from 0 to 1;

$c$  and  $e$  are equal to 0 or 1;

$a + b + c$  is at least 1;

$a + g + c$  is at least 1;

$d$  is equal to 0, 1 or 2;

- 25 when  $Q$  is B then  $c + d = 1$ ;

when  $Q$  is C, Si, Ge or Sn, then  $c + d = 2$ ;

when  $L'$  is N, then  $g + e = 1$ ;

when  $L'$  is O, then  $g = 0$  and  $e = 0$ .

characterized in that at least one  $L$  is a fluorenyl, benzoindenyl or octahydrofluorenyl ring,

- 30 optionally substituted by  $C_1$ - $C_{20}$  alkyl,  $C_3$ - $C_{20}$  cycloalkyl,  $C_6$ - $C_{20}$  aryl,  $C_3$ - $C_{20}$  alkenyl,  $C_7$ - $C_{20}$  arylalkyl,  $C_8$ - $C_{20}$  arylalkenyl or  $C_7$ - $C_{20}$  alkylaryl.

add  
bz

add  
a, 1